

### **Chlorine Usage**

In support of the Water Treatment Plant, a gaseous chlorine is used to disinfect the water. At the River Pump Station, water removed from Melton Hill Lake is continuously pretreated in two sumps with chlorine. The pretreated water is continuously pumped to a Booster Station holding At the Water Treatment Plant, chlorine is fed to the incoming water at a controlled rate from two cylinders connected in series and holding 2000 pounds of chlorine each.

The Water Treatment Plant uses an average of one cylinder per week, and the River Pump Station uses approximately one cylinder every twelve days. Annual usage of chlorine is approximately 65,000 pounds.

In addition, other chemicals used in support of the Water Treatment Plant include aerosol spray cans, 5-gallon size safety cans of solvent, and other small volume size original containers of chemicals used in daily operations. All are properly stored in approved cabinets inside the Water Treatment Plant Maintenance Shop.

A fully-equipped waste accumulation building is utilized for the 90-day accumulation of hazardous waste. An overpack drum complete with spill response materials is provided within this building. This area is posted with appropriate signs required by RCRA regulations. An additional, satellite hazardous waste accumulation area is located adjacent to the 90-day storage building and is used for dispensing of spent fuels and solvents into 55-gallon recovery drums.

### **Control Measures**

ETMC/JCI has initiated several effective control measures regarding chlorine usage and handling.

- Because chlorine is considered a highly hazardous chemical, we comply fully with Process Safety Management requirements. Using this approach, we have evaluated the entire chlorine process from design to use, including: process design, process technology, operational and maintenance activities and procedures, non-routine activities and procedures, emergency preparedness plans and procedures, training programs, and any other elements that have an impact on the process. A DOE inspection found us to be proficient in complying with PSM.
- We have implemented Work Smart Standards for the Water Treatment Plant and River Pump Station.
- We comply fully with the Hazard Communication Program and Worker's Right-to-Know.
- We have completed a project-wide hazard assessment with Lockheed-Martin that determined we have adequate safeguards regarding chlorine usage. Also, a DOE inspection based on DOE Order 5480.19, Conduct of Operations, revealed no areas of chemical vulnerability requiring further actions beyond current practices.

## Summary of East Tennessee Mechanical Contractors, Inc./Johnson Controls, Inc. Chemical Management

- Chlorine is stored in enclosed concrete buildings that remain locked; these measures limit exposure and enhance security. Only authorized persons may enter these buildings. These buildings are checked at a minimum of once per shift, for three shifts in a 24-hour period during routine inspections. A chlorine leak detector monitors the atmosphere of these buildings. If there is a leak, the caustic scrubbing system activates and an alarm alerts the Water Treatment Control Room. The scrubbing system removes and absorbs chlorine fumes from the atmosphere.
- Chlorine detectors also are used throughout the Water Treatment Plant and River Pump Station. The detectors are inspected each week by maintenance employees. Water Treatment Plant Operators check these detectors each shift.
- Chlorine handling presents the highest risk, and operators are provided the highest level of respiratory and skin protection when changing the one-ton cylinders. The chlorine is fed into the water through a "closed" system to prevent personnel contact and is equipped with leak detection. Public access is blocked when changing cylinders to minimize risk. The Emergency Response support organization is notified before cylinder change or cylinder delivery. Each activity is appropriately monitored until concluded.
- Special work permit checklist/request forms are used for each task performed. When chlorine is involved, a Hazard Analysis and Job Safety Analysis are performed to identify potential hazards and safe practices, and appropriate protective equipment.
- The ES&H Committee (hourly & salaried) approves the use and quantities of all chemicals on site, and provides our buyers with an approved list of chemicals. We use on-time delivery of chlorine to maintain a minimum inventory. We only store up to eight one-ton cylinders on a site at any time.
- We have implemented a computerized inventory and tracking system through our Purchasing Department. Chemical inventories are conducted twice annually. These inventories are kept current at each facility and the ES&H Department. Chlorine is strictly controlled on a daily tracking and usage report. We have reduced our inventory of chemicals from 160 to 57 and will continue this reduction/substitution effort with vigor.
- Subcontractors are required to submit a safety plan that includes chemical handling. Only chemicals in quantities necessary to accomplish the work may be brought on site. Subcontractors are checked daily to ensure compliance with standards.
- We have an Emergency Response Team trained according to OSHA Standard 29 CFR 1910.120(g), HAZMAT Technician. A Memorandum of Understanding is in effect with Lockheed-Martin to provide ambulance and Hazardous Material Response.

## **Summary of East Tennessee Mechanical Contractors, Inc./Johnson Controls, Inc. Chemical Management**

- Procedures have been implemented on what to do if there is a chlorine leak, and employees have been trained. We provide the City of Oak Ridge Fire Department with a detailed hazards inventory and a mutual aid agreement is in effect. Joint drills with the City of Oak Ridge Fire Department, Lockheed-Martin Energy Systems, and our personnel are scheduled to ensure effective response coordination.
- We provide training such as HAZWOPER, fire safety training, and chemical specific hazards involved in work tasks. Also, selected personnel receive RCRA training, and DOE hazardous materials training required by HM-126F Rule.

### **Facilities**

- Alternative disinfecting methods have been analyzed and deemed cost prohibitive at this time. Therefore our processes and mode of operation will not change in the near future.

### **Lessons Learned and Occurrence Reporting**

- Outgoing information is characterized in accordance with DOE Order 232.1-1A. The information is compiled by the Quality Assurance Manager, reviewed by the ES&H and Program Managers and approved by the Contracting Officer's Technical Representatives prior to transmission..
- All incoming information is received and reviewed by the QA Manager, who disseminates the information to the appropriate department. If action is required then the appropriate manager will respond in writing to the ES&H Department.